

CAO

Center for Applied Optics

ENHANCE RESEARCH
AND DEVELOPMENT WHILE
ADVANCING OPTICAL AND
PHOTONIC SCIENCE WITH DESIGN,
TESTING AND FABRICATION

BUILDING COMPLEX OPTICAL SYSTEMS
FROM METER TO NANO- SCALE FOR
ENVIRONMENTS FROM THE LAB TO SPACE

PLEASE CONTACT US AT OPTICS@UAH.EDU



THE UNIVERSITY OF
ALABAMA IN HUNTSVILLE



MOORE NANOTECH 250 UPL

SINGLE POINT DIAMOND TURNING MACHINE WITH HIGH RESOLUTION ENCODER AND 100MM RISER PROGRAMMING RESOLUTION OF .01 NM LINEAR



ZEEKO ULTRA-PRECISION IRP600

7 AXIS NC POLISHING MACHINE. WORKPIECE CAPACITY OF 900MM OD OR FREE-FORM 600MM SQUARE. SURFACE FINISH LESS THAN 3 ANGSTROMS (SPECIFIC MATERIAL)



DESIGN & ENGINEERING

PARTNERS FROM DESIGN TO DELIVERABLE PRODUCTS OPTICAL DESIGN AND ANALYSIS USING CODE V, ZEMAX, ASAP, FRED



PROCUREMENT & ITAR

CLASS 100 LAMINAR FLOW BOOTH, DESIGNATE CLASS 1,000 CLEAN ROOMS, REGISTERED AS ITAR COMPLIANT, CAN IMPLEMENT SPC STANDARDS.



NANO-MICRO DEVICES CENTER

7,000 SQFT CLASS 10,000 CLEANROOM, CLASS 1,000 OR LESS IN LITHOGRAPHY AREA. FULL COMPLEMENT OF EQUIPMENT WITH ACCESS FOR INDUSTRIAL USERS

DESIGN & ENGINEERING



SPECIFICATIONS

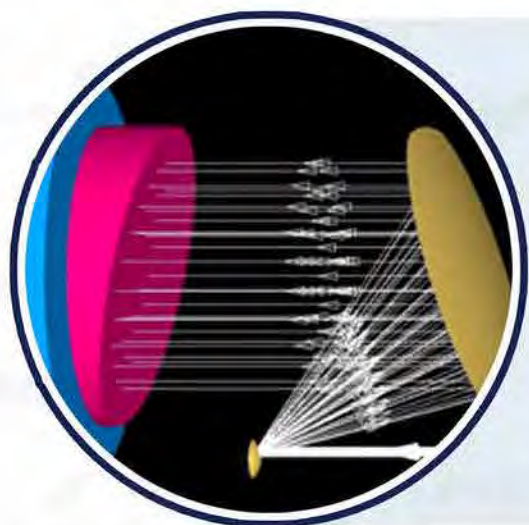
PARTNERS FROM DESIGN TO DELIVERABLE PRODUCT

OPTICAL DESIGN AND ANALYSIS USING CODEV, ZEMAX, ASAP, FRED.

MECHANICAL DESIGN WITH FEA ANALYSIS USING IDEAS

OPTICAL TESTING AND METROLOGY USING ZYGO, WYKO AND HOLOGRAPHIC

*SERVING CUSTOMERS SUCH AS NASA, DEFENSE, COMMERCIAL AEROSPACE
AND PRIVATE INDUSTRY*



SERVICES OFFERED @ CAO

*Optical Design & Analysis
Optical Testing and Metrology
Optical Materials & Fabrication
Opto-Mechanical Design Analysis
Optical Image Processing
Optical Instrument Development*

SOFTWARE & MODELING TOOLS

*SOLID EDGE, CODE V, ZEMAX, PRO-E, WYKO-VISION
PHASESHIFT, ZYGO, RHINO 3D, DIFFSYS*

MOORE NANOTECH 250 UPL



SPECIFICATIONS

WORKPIECE CAPACITY OF 350MM

-C- AXIS ROTARY WITH POSITION ERROR OF .4 ARC SECONDS

FORM ERROR OVER 75MM DIA CONVEX SPHERE LESS THAN 0.08 MICRONS

SURFACE ROUGHNESS LESS THAN 1NM ON ALUMINUM

HIGH RESOLUTION ENCODER WITH PROGRAMMING RESOLUTION
OF .01 NM LINEAR



SHAPES

Plano
Spheres
Parabola / Hyperbola
Conical
Free Form

MATERIALS

ALUMINUM, NICKEL, COPPER
PLASTICS, CRYSTALS

NANO-MICRO DEVICES CENTER



7,000 SQFT CLASS 10,000 CLEANROOM
CLASS 1,000 OR LESS IN LITHOGRAPHY AREA
FULL COMPLEMENT OF EQUIPMENT
LITHOGRAPHY
SPUTTERING AND EVAPORATION
WET/DRY ETCHING
SEM WITH EDX
CONTACT AND OPTICAL METROLOGY
ACCESS FOR INDUSTRIAL USERS
FULL ACCESS DURING STANDARD WORK HOURS
CAN ACCOMMODATE NEEDS FOR PROPRIETARY/ITAR WORK
CAN HANDLE UNUSUAL MATERIALS AND/OR PROCESSING



PROCUREMENT & ITAR



OPERATING PRACTICES

Class 100 Laminar Flow Booths

Designated Class 1,000 Clean Rooms

Registered as ITAR Compliant

Can Implement ISO Standards on Specific Customer Demand

Can Implement SPC Standards

Revision Controlled Documents and/or Drawings as needed



PROCUREMENT SERVICES

PROCUREMENT OF RAW MATERIAL

MACHINING OF PRODUCT

OPTICAL COATING

HEAT TREAT AND/OR

THERMAL CYCLING

CHEMICAL PROCESSING

*ELECTROLESS NICKEL PLATING,
CONVERSION COATINGS, ANODIZE*

ZEEKO IRP 600X

ULTRA-PRECISION POLISHING MACHINE



SPECIFICATIONS

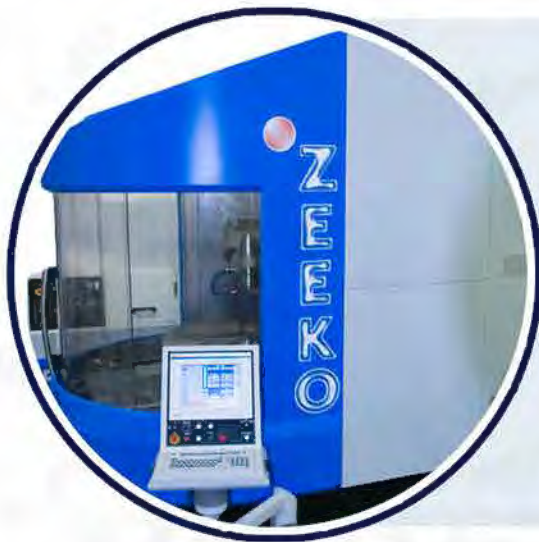
*WORKPIECE CAPACITY OF 900MM OD OR
FREE-FORM 600MM SQUARE*

SURFACE FINISH LESS THAN 3 ANGSTROMS (SPECIFIC MATERIAL)

FORM ERROR OVER LESS THAN 1/20 WAVE P-V

CORRECTIVE AND FINISH POLISHING, JET POLISHING FOR SMOOTHING

*SPIRAL/RASTER/RANDOM TOOL PATH, INCORPORATE CMM DATA
OR INTERFEROMETRIC MAPS*



SHAPES

*Plano
Spheres
Parabola / Hyperbola
Conical
Free Form*

MATERIALS

*ALUMINUM, NICKEL, COPPER
PLASTICS, CRYSTALS*



$$= \left(\frac{\rho^2}{2 \cdot Rch} + \frac{\rho^2 \cdot (k+1)}{8 \cdot Rch^3} + \frac{\rho^3 \cdot (k+1)^2}{16 \cdot Rch^5} + \frac{\rho^3 \cdot (k+1)^3}{128 \cdot Rch^7} + \dots \right) \cdot \frac{1}{1 + \sqrt{1 - (1+k) \left(\frac{\rho^2}{Rch^2} \right)}}$$

$$R_z = Rch \left[1 - \frac{k \cdot y \cos}{Rch} \right] \cdot \frac{1}{1 + \sqrt{1 - (1+k) \left(\frac{\rho^2}{Rch^2} \right)}}$$

$$R_z = Rch \left[1 - \frac{k \cdot y \cos}{Rch} \right] \cdot \frac{1}{1 + \sqrt{1 - (1+k) \left(\frac{\rho^2}{Rch^2} \right)}}$$

$$+ \dots \left(\frac{\rho^2}{Rch} + A\rho^2 + B\rho^4 + C\rho^6 + \dots \right) \cdot \frac{1}{1 + \sqrt{1 - (1+k) \left(\frac{\rho^2}{Rch^2} \right)}}$$

$$R_z = Rch \left[1 - \frac{k \cdot y \cos}{Rch} \right] \cdot \frac{1}{1 + \sqrt{1 - (1+k) \left(\frac{\rho^2}{Rch^2} \right)}}$$

$$+ \dots \left(\frac{\rho^2}{Rch} + A\rho^2 + B\rho^4 + C\rho^6 + \dots \right) \cdot \frac{1}{1 + \sqrt{1 - (1+k) \left(\frac{\rho^2}{Rch^2} \right)}}$$



- 1. **ELC** Early Learning Center
- 2. **NCR** North Campus Residence Hall
- 3. **FFH** Frank Franz Hall
- 4. **MCH** Morton Hall
- 4a. Studio 106/Black Box Theatre and Meeting Hall
- 5. **UGG** Union Grove Gallery and Meeting Hall
- 6. **SPR** Spragins Hall
- 7. **ROB** Roberts Hall
- 7a. Roberts Rectal Hall
- 8. **CTC** Conf. Training Center/Charger Cafe Exhibit Hall
- 9. **CCH** Central Campus Residence Hall
- 10. **BEV** Bevill Conference Center & Hotel
- 11. **NRN** Nursing Building
- 12. **LIB** M. Louis Salmon Library Amphitheater
- 14. **WLS** Wilson Hall/Disability Support
- 14a. Wilson Theatre

- 15. **DCI** D.S. Davidson Invention to Innovation Center (I²C)
- 16. **BAB** Business Administration Bldg
- 16a. Chan Auditorium
- 17. **UCF** University Fitness Center
- 18. **IPF** Intermodal Parking Facility
- 18a. Public Safety
- 19. **CU** Charger Union
- 20. **SSC** Shelby Center for Sci. and Techn.
- 21. Greek Row
- 22. **SECH** Southeast Campus Housing
- 23. Charger Village Food Court
- 24. **CV** Charger Village
- 25. **ACU** Alabama Credit Union
- 26. University Greenway
- 27. **SSB** Student Services Bldg./Admissions/Campus Visits
- 28. **CR** Robert "Bud" Cramer Research Hall (NSSTC and NOAA Weather Forecasting Office)

- 29. **SWIRL** (Severe Weather Institute and Radar & Lightning Laboratories)
- 30. **CP** Charger Park
- 31. **OPB** Optics Building
- 32. **MSB** Materials Science Building
- 32a. McDonnell Douglas Auditorium
- 33. **ENB** Engineering Building
- 34. **WBR** Wernher von Braun Research Hall
- 35. VBH Annex
- 36. **PPB** Physical Plant Building
- 37. **CRS** Central Receiving and Shipping
- 38. **JRC** Johnson Research Center
- 39. Propulsion Research Lab
- 40. **WLRH** Radio Station
- 41. **BSB** Business Services Bldg./Copy Center
- 42. **SKH** Shelby King Hall
- 43. **OKT** Olin B. King Technology Hall
- 43a. Oak Ridge-Huntsville Partnership
- 44. **UP** University Park

OPTICS BUILDING OPB400
301 SPARKMAN DRIVE
HUNTSVILLE, AL 35899
256-824-2528
WWW.UAH.EDU/CAO